

CLAIMS

What is claimed is:

1. A method for configuring an equipment-based system for a user, the method comprising:
creating a model for each proposed piece of equipment in the system, the model having properties and rules, wherein the rules define conditions and actions;
creating an object for each piece of equipment in the system;
receiving selections for values for properties for the pieces of equipment;
executing any rules that have as a condition the properties for which value selections are received; and
testing to determine if a proposed configuration is valid by examining results of said rule execution.
2. The method of claim 1, wherein the model includes a product model, said product model having at least one port.
3. The method of claim 2, wherein said port has at least one connector and at least one traffic type.
4. The method of claim 1, wherein the model includes a cable model, said cable model comprising connector and cable specifications.

5. The method of claim 4, wherein said cable model further includes a cable to connector association.
6. The method of claim 1, wherein said receiving includes receiving a selection made by a user for a value for a property for said piece of equipment.
7. The method of claim 1, further comprising displaying effects of said execution of rules to a user.
8. The method of claim 1, wherein said creating includes creating a model using an extensible markup language.
9. The method of claim 1, wherein said creating includes creating a model in a relational database.
10. The method of claim 1, wherein said model partially comprises a smart part number.
11. The method of claim 1, wherein each rule has a condition statement and an effect statement.
12. The method of claim 11, wherein said condition statement has at least one variable token and evaluating said condition statement includes replacing said variable tokens with their corresponding values.

13. The method of claim 1, wherein said model includes racking information regarding said piece of equipment.
14. The method of claim 13, further comprising utilizing racking templates along with said model to determine if said model is compatible with a specific racking implementation.
15. The method of claim 1, further comprising generating a price quote based on said configuration.
16. A method for adding a piece of equipment to a design of an equipment-based system, the added piece of equipment having a model, the model having associated properties and rules, wherein the rules define conditions and actions, the method comprising:
- creating an object for said added piece of equipment;
 - receiving a selection for a value for a property for said piece of equipment;
 - executing any rules that have as a condition said property; and
 - testing to determine if any of said executed rules necessitates the change of said object by executing at least one object behavior rule.
17. The method of claim 16, wherein said receiving includes receiving a selection made by a user for a value for a property for said added piece of equipment.

18. The method of claim 16, further comprising displaying effects of said execution of rules to a user.

19. The method of claim 16, wherein a necessitated change of said object includes a change to port quantity.

20. A method for adding a piece of equipment to a design of an equipment-based system, the added piece of equipment having a model, the model having associated properties and rules, wherein the rules define conditions and actions and are bi-directional, the method comprising:

creating an object for said added piece of equipment;

receiving a selection for a value for a property for said added piece of equipment;

executing any rules that have as a condition said property, producing effects;

executing any rules that have as a condition said effects;

testing to determine if any of said executed rules necessitates the change of said object by executing at least one object behavior rule.

21. A method for adding a connection between pieces of equipment in a design of an equipment-based system, the pieces of equipment each having a model, the method comprising:

comparing port detail, payload, protocol, signal types, and cabling requirements in the model for each of the pieces of equipment;

indicating the connection is not valid if ports at end-points of each of the pieces of equipment are not available for connection;

indicating the connection is not valid if a fixed connection rule is not available for the connection and payload carried by both of said end-points is not compatible;

indicating the connection is not valid if a fixed connection rule is not available for the connection, protocol and signal type carried by both of said endpoints is not compatible, and a converter is not available to bridge the gap between said incompatible protocol and/or signal types;

indicating the connection is not valid if a fixed connection rule is not available for the connection, the medium at the end-points is not compatible, and a converter is not available to bridge the gap between said incompatible media; and

indicating the connection is not valid if the connection is listed in a compatibility issues table and no resolution code is listed which can be executed.

22. A method for adding a connection between pieces of equipment in a design of an equipment-based system where one of the pieces of equipment is passive, the pieces of equipment each having a model, the method comprising:

determining if signals are defined for any passive ports in the pieces of equipment;

indicating that the connection is not valid if signals are defined for any passive ports and signals at the connection endpoints are incompatible;

isolating all cables with a common cable type specified at the connection endpoints;

indicating that the connection is not valid if no matching cables are found;

isolating all cables and connectors that mate with the connectors specified at the connection endpoints;

indicating that the connection is not valid if no matching cables with connectors are found; and

indicating that the connection is not valid if the connection is listed in compatibility issues and no executable resolution code is listed.

23. A method for selecting a cable to connect two or more pieces of equipment in a design of an equipment-based system, the method comprising:

isolating all cables of a common cable type specified at each of the pieces of equipment;

indicating no cable is available if no cables match said common cable type;

isolating all cables with connectors that mate with ones specified at each of the pieces of equipment;

indicating no cable is available if no cables have connectors that mate with the ones specified at each of the pieces of equipment and no adapter is available for either piece of equipment;

isolate all cables with diameters within a minimum and maximum value of a composite cabling specification;

indicating no cable is available if no cables are available with diameters within said minimum and maximum value of the composite cabling specification;

determining if a preferred cable manufacturer is specified;

isolating all cables made by the preferred cable manufacturer if one is specified; and

displaying all cable choices to a user for selection if more than one cable is still available.

24. An apparatus for configuring an equipment-based system for a user, the apparatus comprising:

- a model creator;
- an object creator coupled to said model creator;
- a value selection receiver coupled to said object creator;
- a rules engine coupled to said value selection receiver; and
- a proposed configuration tester coupled to said rules engine.

25. An apparatus for adding a connection between pieces of equipment in a design of an equipment-based system, the pieces of equipment each having a model, the apparatus comprising:

- a port detail, payload, protocol, signal types, and cabling requirements comparer; and
- an invalid connection indicator coupled to said port detail, payload, protocol, signal types, and cabling requirements comparer.

26. An apparatus for adding a connection between pieces of equipment in a design of an equipment-based system where one of the pieces of equipment is passive, the pieces of equipment each having a model, the apparatus including:

- a defined signal determiner;
- an invalid connection indicator coupled to said defined signal determiner; and
- a cable and connection isolator coupled to said invalid connection indicator.

27. An apparatus for selecting a cable to connect two or more pieces of equipment in a design of an equipment-based system, the apparatus comprising:

a common cable type cable isolator;

a no matching cable indicator coupled to said common cable type cable isolator;

a cable diameter cable isolator coupled to said no matching cable indicator;

a no available cable indicator coupled to said cable diameter cable isolator;

a specified preferred cable manufacturer determiner coupled to said no available cable indicator;

a preferred cable manufacturer cable isolator coupled to said specified preferred cable manufacturer determiner;

a cable choice displayer coupled to said preferred cable manufacturer cable isolator.

28. An apparatus for configuring an equipment-based system for a user, the apparatus comprising:

means for creating a model for each proposed piece of equipment in the system, the model having properties and rules, wherein the rules define conditions and actions;

means for creating an object for each piece of equipment in the system;

means for receiving selections for values for properties for the pieces of equipment;

means for executing any rules that have as a condition the properties for which value selections are received; and

means for testing to determine if a proposed configuration is valid by examining results of said rule execution.

29. The apparatus of claim 28, wherein the model includes a product model, said product model having at least one port.
30. The apparatus of claim 29, wherein said port has at least one connector and at least one traffic type.
31. The apparatus of claim 28, wherein the model includes a cable model, said cable model comprising connector and cable specifications.
32. The apparatus of claim 31, wherein said cable model further includes a cable to connector association.
33. The apparatus of claim 28, wherein said means for receiving includes means for receiving a selection made by a user for a value for a property for said piece of equipment.
34. The apparatus of claim 28, further comprising means for displaying effects of said execution of rules to a user.
35. The apparatus of claim 28, wherein said means for creating includes means for creating a model using an extensible markup language.
36. The apparatus of claim 28, wherein said means for creating includes means for creating a model in a relational database.

37. The apparatus of claim 28, wherein said model partially comprises a smart part number.
38. The apparatus of claim 28, wherein each rule has a condition statement and an effect statement.
39. The apparatus of claim 38, wherein said condition statement has at least one variable token and means for evaluating said condition statement includes means for replacing said variable tokens with their corresponding values.
40. The apparatus of claim 28, wherein said model includes racking information regarding said piece of equipment.
41. The apparatus of claim 40, further comprising means for utilizing racking templates along with said model to determine if said model is compatible with a specific racking implementation.
42. The apparatus of claim 28, further comprising means for generating a price quote based on said configuration.
43. An apparatus for adding a piece of equipment to a design of an equipment-based system, the piece of equipment having a model, the model having properties and rules, wherein the rules define conditions and actions, the apparatus comprising:

means for creating an object for said piece of equipment;

means for receiving a selection for a value for a property for said piece of equipment;

means for executing any rules that have as a condition said property; and

means for testing to determine if any of said executed rules necessitates the change of said object by executing at least one object behavior rule.

44. The apparatus of claim 43, wherein said means for receiving includes means for receiving a selection made by a user for a value for a property for said piece of equipment.

45. The apparatus of claim 43, further comprising means for displaying effects of said execution of rules to a user.

46. The apparatus of claim 43, wherein a necessitated change of said object includes a change to port quantity.

47. An apparatus for adding a piece of equipment to a design of an equipment-based system, the piece of equipment having a model, the model having properties and rules, wherein the rules define conditions and actions and are bi-directional, the apparatus comprising:

means for creating an object for said piece of equipment;

means for receiving a selection for a value for a property for said piece of equipment;

means for executing any rules that have as a condition said property, producing effects;

means for executing any rules that have as a condition said effects;

means for testing to determine if any of said executed rules necessitates the change of said object by executing at least one object behavior rule.

48. An apparatus for adding a connection between pieces of equipment in a design of an equipment-based system, the pieces of equipment each having a model, the apparatus comprising:

means for comparing port detail, payload, protocol, signal types, and cabling requirements in the model for each of the pieces of equipment;

means for indicating the connection is not valid if ports at end-points of each of the pieces of equipment are not available for connection;

means for indicating the connection is not valid if a fixed connection rule is not available for the connection and payload carried by both of said end-points is not compatible;

means for indicating the connection is not valid if a fixed connection rule is not available for the connection, protocol and signal type carried by both of said endpoints is not compatible, and a converter is not available to bridge the gap between said incompatible protocol and/or signal types;

means for indicating the connection is not valid if a fixed connection rule is not available for the connection, the medium at the end-points is not compatible, and a converter is not available to bridge the gap between said incompatible media; and

means for indicating the connection is not valid if the connection is listed in a compatibility issues table and no resolution code is listed which can be executed.

49. An apparatus for adding a connection between pieces of equipment in a design of an equipment-based system where one of the pieces of equipment is passive, the pieces of equipment each having a model, the apparatus comprising:

means for determining if signals are defined for any passive ports in the pieces of equipment;

means for indicating that the connection is not valid if signals are defined for any passive ports and signals at the connection endpoints are incompatible;

means for isolating all cables with a common cable type specified at the connection endpoints;

means for indicating that the connection is not valid if no matching cables are found;

means for isolating all cables and connectors that mate with the connectors specified at the connection endpoints;

means for indicating that the connection is not valid if no matching cables with connectors are found; and

means for indicating that the connection is not valid if the connection is listed in compatibility issues and no executable resolution code is listed.

50. An apparatus for selecting a cable to connect two or more pieces of equipment in a design of an equipment-based system, the apparatus comprising:

means for isolating all cables of a common cable type specified at each of the pieces of equipment;

means for indicating no cable is available if no cables match said common cable type;

means for isolating all cables with connectors that mate with ones specified at each of the pieces of equipment;

means for indicating no cable is available if no cables have connectors that mate with the ones specified at each of the pieces of equipment and no adapter is available for either piece of equipment;

means for isolate all cables with diameters within a minimum and maximum value of a composite cabling specification;

means for indicating no cable is available if no cables are available with diameters within said minimum and maximum value of the composite cabling specification;

means for determining if a preferred cable manufacturer is specified;

means for isolating all cables made by the preferred cable manufacturer if one is specified; and

means for displaying all cable choices to a user for selection if more than one cable is still available.

51. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for configuring an equipment-based system for a user, the method comprising:

creating a model for each proposed piece of equipment in the system, the model having properties and rules, wherein the rules define conditions and actions;

creating an object for each piece of equipment in the system;

receiving selections for values for properties for the pieces of equipment;

executing any rules that have as a condition the properties for which value selections are received; and

testing to determine if a proposed configuration is valid by examining results of said rule execution.

52. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for adding a piece of equipment to a design of an equipment-based system, the piece of equipment having a model, the model having properties and rules, wherein the rules define conditions and actions, the method comprising:

creating an object for said piece of equipment;

receiving a selection for a value for a property for said piece of equipment;

executing any rules that have as a condition said property; and

testing to determine if any of said executed rules necessitates the change of said object by executing at least one object behavior rule.

53. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for adding a piece of equipment to a design of an equipment-based system, the piece of equipment having a model, the model having properties and rules, wherein the rules define conditions and actions and are bi-directional, the method comprising:

creating an object for said piece of equipment;

receiving a selection for a value for a property for said piece of equipment;

executing any rules that have as a condition said property, producing effects;

executing any rules that have as a condition said effects;

testing to determine if any of said executed rules necessitates the change of said object by executing at least one object behavior rule.

54. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for adding a connection between pieces of equipment in a design of an equipment-based system, the pieces of equipment each having a model, the method comprising:

comparing port detail, payload, protocol, signal types, and cabling requirements in the model for each of the pieces of equipment;

indicating the connection is not valid if ports at end-points of each of the pieces of equipment are not available for connection;

indicating the connection is not valid if a fixed connection rule is not available for the connection and payload carried by both of said end-points is not compatible;

indicating the connection is not valid if a fixed connection rule is not available for the connection, protocol and signal type carried by both of said endpoints is not compatible, and a converter is not available to bridge the gap between said incompatible protocol and/or signal types;

indicating the connection is not valid if a fixed connection rule is not available for the connection, the medium at the end-points is not compatible, and a converter is not available to bridge the gap between said incompatible media; and

indicating the connection is not valid if the connection is listed in a compatibility issues table and no resolution code is listed which can be executed.

55. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for adding a connection between pieces of equipment in a design of an equipment-based system where one of the pieces of equipment is passive, the pieces of equipment each having a model, the method comprising:

determining if signals are defined for any passive ports in the pieces of equipment;

indicating that the connection is not valid if signals are defined for any passive ports and signals at the connection endpoints are incompatible;

isolating all cables with a common cable type specified at the connection endpoints;

indicating that the connection is not valid if no matching cables are found;

isolating all cables and connectors that mate with the connectors specified at the connection endpoints;

indicating that the connection is not valid if no matching cables with connectors are found; and

indicating that the connection is not valid if the connection is listed in compatibility issues and no executable resolution code is listed.

56. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for selecting a cable to connect two or more pieces of equipment in a design of an equipment-based system, the method comprising:

isolating all cables of a common cable type specified at each of the pieces of equipment;

indicating no cable is available if no cables match said common cable type;

isolating all cables with connectors that mate with ones specified at each of the pieces of equipment;

indicating no cable is available if no cables have connectors that mate with the ones specified at each of the pieces of equipment and no adapter is available for either piece of equipment;

isolate all cables with diameters within a minimum and maximum value of a composite cabling specification;

indicating no cable is available if no cables are available with diameters within said minimum and maximum value of the composite cabling specification;

determining if a preferred cable manufacturer is specified;

isolating all cables made by the preferred cable manufacturer if one is specified; and

displaying all cable choices to a user for selection if more than one cable is still available.